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PLANT IMMIGRANTS

No. 211

November, 1923

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The Chinese Hairy Chestnut
(*Castanea mollissima* Blume.)

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United States Department of Agriculture

BUREAU OF PLANT INDUSTRY

OFFICE OF FOREIGN SEED AND PLANT INTRODUCTION

E X P L A N A T O R Y N O T E

PLANT IMMIGRANTS is designed principally to call the attention of plant breeders and experimenters to the arrival of interesting plant material. It should not be viewed as an announcement of plants available for distribution, since most introductions have to be propagated before they can be sent to experimenters. This requires from one to three years, depending upon the nature of the plant and the quantity of live material received. As rapidly as stocks are available, the plants described in this circular will be included in the Annual List of Plant Introductions, which is sent to experimenters in late autumn. Introductions made for a special purpose (as for example to supply Department and other specialists with material needed in their experiments) are not propagated by this Office and will not appear in the Annual List.

Descriptions appearing here are revised and later published in the Inventory of Seeds and Plants Imported, -the permanent record of plant introductions made by this Office.

DAVID FAIRCHILD
*Agricultural Explorer in Charge,
Office of Foreign Seed and Plant Introduction.*

Issued February 16, 1924, Washington, D. C.

CELTIS SELLOVIANA (Ulmaceae), 57931. From Montevideo, Uruguay. Seeds presented by the Director, Direccion General de Paseos Publicos. A much-branched, spiny shrub, native to southern Brazil, with narrow, membranous, light-green, sharp-pointed leaves less than an inch long, and inconspicuous flowers. (Adapted from Martius, Flora Brasil-iensis, vol. 4, pt. 1, p. 179.)

EPHEDRA ALTISSIMA (Gnetaceae), 57930. From Nice, France. Seeds presented by Dr. A. Robertson Proschowsky. "This is a strikingly ornamental climber, attractive at all times, but especially so when covered with its small red fruits." (Proschowsky.)

EUGENIA GLAUCESCENS (Myrtaceae), 57932. From Montevideo, Uruguay. Seeds presented by the Director, Direccion General de Paseos Publicos. A large shrub, native to southern Brazil, with rather short, very narrow leaves up to $2\frac{1}{2}$ inches in length, and small white flowers borne singly in the axils of the leaves. (Adapted from St. Hilaire, Flora Brasiliæ Meridionalis, vol. 2, p. 368.)

MALUS SYLVESTRIS (Malaceæ), 57938. Apple. From Melbourne, Victoria. Budwood presented by C. F. Cole, Orchard Supervisor, Department of Agriculture. "'Cole.' Fruit medium-sized, roundish, inclined to oblate, fairly uniform in shape and size. Stem short, slender. Cavity rather deep, acute, symmetrical. Calyx small. A beautiful apple, highly colored and with a fine aroma. The apple gives evidence of being a good keeper and a good shipper. A specimen of this fruit forwarded by Mr. Cole in April reached us in good condition six weeks later although packed in an ordinary small wooden box. Other specimens forwarded July 13, 1923, reached us August 21 in excellent condition. If this variety proves resistant to woolly aphid as claimed, it will prove a valuable acquisition to our apple collection." (B. T. Galloway.)

"This is a chance seedling, supposed to be a cross between 'Jonathan' and 'Dutch Mignone.' The original seedling is still standing upon the property of R. G. Cole, orchardist, Lang Lang, Victoria, where the seed germinated. The producer first exhibited this apple at the fruit carnival held in the Exhibition Buildings, Melbourne, in 1912, and won the silver medal for a Victoria-raised seedling. The seedling was registered with the Royal Horticultural Society of Victoria under the name of 'R. G. Cole's Champion.' The writer submitted it under the name of 'Cole's Champion' to the committee of the Australia Pomological Society but owing to likely confusion the word 'Champion' has been dropped, and 'Cole' accepted as the future name of this apple.

"The tree is very productive, and a strong upright grower. The wood is dark, becoming reddish with age and lightly speckled with grey

dots; the buds are moderately prominent; the foliage is medium-sized and dark green. During the 1920 fruit season 22 cases of salable fruit were gathered from the original seedling tree. The flowers are not bold, and are medium-sized. The blossoming period is from the 12th to the 20th of October in Victoria.

"The apple, which has been tested under cool storage conditions, is a handsome dessert type of medium size, roundish conical, or tapering; the skin is thin and smooth; the ground clear pale yellow, splashed with lively red narrow broken stripes. The whole of the exposed surface is a light red, becoming deeper in color when exposed to the sun. The flesh is firm, white, crisp, juicy, sweet, with a slightly perfumed aromatic flavor; the core is compact, the stalk thin, and averaging three-quarters of an inch in length, inserted in a deep, fairly regular cavity. The calyx is small and closed; the segments pointed, slightly recurved, and set in a deep, rather narrow and corrugated basin. Its season in Victoria is April to September. It has been proved to be a very good keeper in cool storage, and while stored it emits a strong aroma. It could be gathered in some districts about the middle of March. This variety is being largely planted and it promises to become one of the best late apples introduced." (Journal of the Department of Agriculture, Victoria, August, 1922, p. 492.)

MILLETTIA THONNINGI (Fabaceae), 57682. From Loanda, Angola, Africa. Seeds presented by John Gossweiler. "A beautiful avenue tree of Loanda; it is easily cultivated here since it grows well with an annual rainfall of only 300 mm. (12 inches) and can readily be propagated by cuttings 2 meters (6 feet) in length. It is evidently a poisonous species." (Gossweiler.)

A very handsome tree, with large drooping racemes of pale-lilac flowers. It grows to a height of 30 to 40 feet, has compound leaves about 6 inches in length, and very narrow, woody pods. (Adapted from Oliver, Flora of Tropical Africa, vol. 2, p. 128.)

NATHUSIA sp. (Oleaceae), 57941. From Barberton, Transvaal. Seeds presented by George Thorncroft. "A tree about 20 feet high with sweet-scented flowers resembling those of the jasmine." (Thorncroft.)

NYPA FRUTICANS (Phoenicaceae), 57940. Nipa palm. From Lamo, Philippine Islands. Seeds presented by H. H. Boyle, of the Columbian Rope Co., Manila, through the Bureau of Agriculture, Manila. From an economic standpoint this palm is one of the most important in the Philippines. It occurs along tidal streams throughout the Archipelago and thrives only in brackish swamps. The "nipa," as it is called, has a

stout, creeping, underground stem, and the pinnate leaves, which are in erect clusters, are 7 meters (23 feet) or more in length. The flat fruits, 5 inches long, 4 inches wide, and 2 inches thick, are crowded in a large, round head which is borne on a special, erect stalk. The juice obtained by cutting this stalk just below the fruiting head is a very promising source of sugar and alcohol. Eighty-five per cent of the 3,000,000 gallons of proof alcohol produced annually in the Philippines probably comes from the nipa palm. The leaves of this palm are extensively used for thatching and for making baskets and mats, and the immature seeds are boiled in sugar to form a confection. In addition to the above the tree is also a pleasing ornamental. (Adapted from Brown and Merrill, Philippine Palms and Palm Products, p. 98.)

PERSEA AMERICANA (Lauraceae), 58019. Avocado. From Caracas, Venezuela. Seeds presented by H. Pittier. "The fruits from which these seeds were taken were obtained from a peddler here in Caracas. They are pear-shaped, of uniform size, about 4 inches long and 2 inches in diameter. The rather tough skin is light yellow, and the flesh, rather well developed in proportion to the seed, has a peculiar but agreeable flavor." (Pittier.)

POECILANTHE PARVIFLORA (Fabaceae), 57934. From Montevideo, Uruguay. Seeds presented by the Director, Direccion General de Paseos Publicos. The lapachillo, as it is called in its native home on the Uruguay River, is a tree of great beauty with its finely divided leaves and small, dense clusters of pink flowers. The heartwood is dark brown, very hard, heavy and durable. (Adapted from Journal of the Linnean Society, vol. 4, suppl., p. 80, and Lillo, Contribucion al Conocimiento de los Arboles de la Argentina, p. 107.)

POMADERIS APETALA (Rhamnaceae), 57935. From Montevideo, Uruguay. Seeds presented by the Director, Direccion General de Paseos Publicos. A tree occasionally 60 feet in height but usually smaller, native to southeastern Australia. The foliage is eaten readily by stock, often in preference to their customary feed. (Adapted from Mueller, Select Extra-Tropical Plants, p. 416.)

PROSOPIS NANDUBEY (Mimosaceae), 57936. From Montevideo, Uruguay. Seeds presented by the Director, Direccion General de Paseos Publicos. A tree of moderate height which is frequent in the mountainous regions of Uruguay. The numerous small yellowish flowers appear in the spring, and the sickle-shaped pods inclose a pulp of acid flavor. Because of its great durability, the wood is prized for industrial purposes. (Adapted from Arechavaleta, Flora Uruguaya, vol. 1, p. 419.)

STRYCHNOS GILLETI (Loganiaceae), 58020. From Kisantu, Belgian Congo. Seeds presented by Frere J. Gillet. "The fruits of this species are edible." (Gillet.)

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A spiny shrub closely related to the Kafir orange (*S. spinosa*) and found growing wild in thickets in the Belgian Congo. The leathery, shining leaves are oblong-ovate, deeply notched at the apex, and the fruits are about 2 inches in diameter. (Adapted from *Annales du Musée du Congo*, ser. 5, vol. 1, p. 176.)

WATSONIA FLAVIDA (Iridaceae), 57942. From Barberton, Transvaal. Seeds presented by George Thorncroft. "This is very closely allied to the gladiolus, but the flowers are smaller and creamy white. It grows on stony hills in this region at an altitude of 4,000 feet." (Thorncroft.)

Notes on the Behavior of Previous Introductions.

AMYGDALUS PERSICA (Amygdalaceae), 41395. - Peach. From Kiaying-chow, Kwangtung, China. "This is doing very well; the crop is so heavy that the branches have to be propped. The fruits are of excellent flavor and especially good for canning." (Mrs. N. C. Sweet, Pasadena, Calif., November 30, 1923.)

AMYGDALUS PERSICA (Amygdalaceae), 43129. Peach. "Late Champion." From Auckland, New Zealand. "This tree was received in 1921; this fall it matured 7 large fruits of splendid color and good flavor. The crop would have been larger but for a severe wind storm." (Edward P. Bates, Pittsburg, Pa., October 4, 1923.)

AMYGDALUS PERSICA (Amygdalaceae), 43132. Peach. "Motion's Cling." From Auckland, New Zealand. "Although our tree was only received a year ago last April, it is now over 15 feet in height and bore, this year, enough peaches to fill a large dish pan." (V. F. Malsfoey, San Fernando, Calif., October 27, 1923.)

CHAYOTA EDULIS (Cucurbitaceae). Chayote. "In February, 1922, I received two chayote fruits. Early in the fall of 1922 the plants were killed to the ground by frost, but came up again the following spring, made a remarkable growth, and bore heavily the next fall from November to late in December, when killed to the ground again by frost. The fruits were firm and of good size. I regard it as a most satisfactory asset for my garden, as it stands considerable frost without root injury in this region." (Mrs. M. S. Railey, Los Altos, Calif., December 26, 1923.)

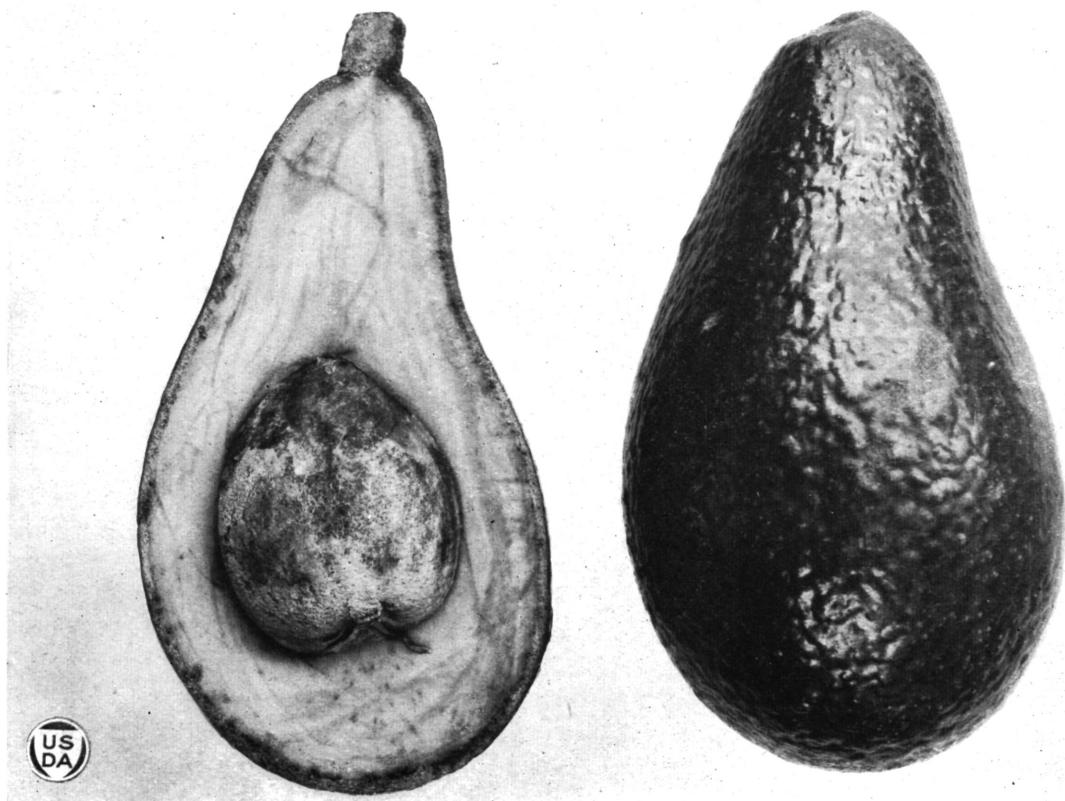
CHAYOTA EDULIS (Cucurbitaceae). Chayote. "The chayotes are doing well, and we shall have quite a lot if the frost keeps off. The chayote is decidedly the best and most useful vegetable in my garden." (C. C. Shooter, Earleton, Fla., Nov. 2, 1923.)



**FIRST FRUIT OF THE ITZAMNA AVOCADO PRODUCED IN THE
UNITED STATES.**

(*Persea americana* Mill.; S. P. I. No. 55736.)

Itzamna was introduced from Guatemala in October, 1916. Two years later—November, 1918—a bud inserted in an old avocado tree at the Miami Garden had grown to a height of 18 feet and was carrying the fruit shown in the above photograph. When it is remembered that Guatemalan avocados require nearly one year from the time of flowering to reach maturity, the record made by this introduction seems remarkable. It is rarely possible to secure such prompt results in the introduction of tree fruits, most of which must be grown in this country several years before they give any indication of their character and value. (Photographed by Edward Goucher and Dr. B. T. Galloway, Plant Introduction Garden, Miami, Fla., November 22, 1918; P24578FS.)



A LATE-RIPENING GUATEMALAN AVOCADO.

(*Persea americana* Mill.; S. P. I. No. 55736.)

The Itzamna avocado, introduced from Guatemala in 1916, ripens later in southern Florida than any other commercially valuable sort of the Guatemalan race. The entire crop remains on the tree until March or April. In quality the fruit is excellent, the flesh being deep yellow in color, free from fiber, unusually dry, and of rich flavor. Since the tree is a vigorous grower and promises to bear good crops, the variety merits extensive trial in southern Florida, where good avocados are scarce during late winter and spring. (Photographed by E. L. Crandall, Photographic Laboratory, April 7, 1923; P28177FS.)

DIOSCOREA ALATA (Dioscoreaceae), 46801. **Greater Yam.** "Following your planting directions, this has made a wonderful growth. The yams, eight in number, ranged in size from 3 by 8 inches to 8 by 12 inches. Some of these we have cooked and served mashed. The flavor is excellent, resembling potatoes mixed with ground nuts. This yam should do very well in this community on a commercial basis. On December 24 I gathered nearly 3 gallons of aerial bulblets from the vines, which I shall distribute to other interested persons here." (J. S. Boyles, County Surveyor, Houston, Tex., December 30, 1923.)

MEDICAGO FALCATA (Fabaceae), 24452 (also other introductions). **Alfalfa.** From Tomsk, Siberia. "This species has been propagated until we now have 10 acres of it planted at the Rampart Station. It has been found absolutely hardy, surviving the winter in places where other alfalfas winterkill. It is the most valuable legume so far discovered for interior Alaska. Cherno, Cossack, Orenberg, Semipalatinsk, and other Siberian alfalfas have been tried, but they have not equalled *M. falcata* in hardiness or seed-bearing qualities." (Report of the Alaska Agricultural Experiment Stations, 1922, p. 5.)

MEIBOMIA TILIAEFOLIA (Fabaceae), 44862. From Nice, France. "This shrub was planted in 1919, and is now about 9 feet high. It is quite hardy and a profuse bloomer." (Mrs. N. C. Sweet, Pasadena, Calif., November 30, 1923.)

PRUNUS AVIUM (Amygdalaceae), 33223. **Cherry.** "Garrafal le Grand." From Granada, Spain. "A very beautiful tree which grows like the Japanese cherries. This year we had about two dozen delicious sweet cherries from it." (Mrs. Lewis C. Perley, Poulsbo, Wash., August 13, 1923.)

PYRUS SEROTINA (Malaceae), 38262. **Pear.** From Honan, China. "I received this tree in 1918, and this year it bore more than twenty good fruits. These are of good size and keep well, making this variety valuable for market purposes." (W. M. Ramsey, Montclair, N. J., October 16, 1923.)

SYRINGA REFLEXA (Oleaceae), 45920. **Lilac.** Originally from Hupeh, China. "A rapid grower and hardy. The shrub is now over 6 feet high and bloomed this spring." (S. G. Harry, Ohio Agricultural Experiment Station, Wooster, Ohio, December 13, 1923.)

TIGRIDIA PAVONIA (Iridaceae), 46981. **Tiger Flower.** From Coyacan, Mexico. "From the three bulbs received some years ago I now have more than a hundred plants, which are in flower continuously from August 1 to November 15." (R. S. Elliott, Fresno, Calif., October 16, 1923.)

ZIZIPHUS JUJUBA (Rhamnaceae), 17752 and 30488. *Jujube*. From China. "These trees are now about 12 feet high. They bore their first crop in 1920, and this year the crop was heavy. The fruits are as large as prunes, and very fine when processed." (R. S. Elliott, Fresno, Calif., October 16, 1923.)

The Chinese Hairy Chestnut.
(*Castanea mollissima* Blume.)

Interest in our native chestnut has recently been reawakened by conditions affecting our tannin industry. The American chestnut furnished one of the most important sources of tannin, providing annually over 47 per cent of the material used here. For twenty years the blight fungus has ravaged our native chestnut forests and it would seem to be only a question of a few years when this valuable tree will be entirely wiped out. The users of tannin material are naturally concerned over the outlook and are casting about for substitutes to take the place of our valuable native tree.

A number of years ago the Office of Foreign Seed and Plant Introduction inaugurated work, looking toward the securing of blight-resistant chestnuts and related species from foreign sources. During the last sixteen years more than a hundred different lots of chestnuts have been brought in, catalogued, tested and distributed. Special attention has been given to the Chinese hairy chestnut, known botanically as *Castanea mollissima* and commonly referred to in our records as the *mollissima* chestnut of China. The late Frank N. Meyer, agricultural explorer of this office, discovered the true blight fungus on the *mollissima* type in China early in June, 1913. This discovery cleared up much of the mystery surrounding the origin of the disease and suggested the desirability of thoroughly testing the Chinese species here, especially as it gave evidence of being more or less resistant. Between the years 1906 and 1914 large seed importations of the Chinese hairy chestnut were made, chiefly through Mr. Meyer's efforts, who secured them from northeastern China, mainly the province of Chihli to the north and northeast of Peking. These early importations of seeds were sent to Chico, Calif., and grown at our Plant Introduction Garden there. During the past ten years more than ten thousand young trees of the Chinese hairy chestnut have been grown and distributed to all parts of the United States. A good many of these trees have gone to public parks, others have been placed in the hands of foresters, and a considerable number have found their way into test nurseries and gardens of private experimenters. With a view to ascertaining what had happened to the trees, a questionnaire was distributed with the result that the mortality from one cause or another is shown to have been very heavy. Of the 10,595 trees dis-

tributed between the years 1914 and 1916, only 1,019 are reported alive. Drought, frost, fires, and lack of adaptability to climate are set down as the chief causes of death. In the northeastern sections of the United States blight is said to have caused the death of many trees, although numbers of reports show the trees have resisted blight where the American chestnut succumbed. This is particularly true of the experimental planting made at Bell, Md., by the late Dr. Walter Van Fleet of the Office of Horticultural Investigations. That planting is now ten years old and the trees have been fruiting for the past five or six years. The orchard originally contained over 1400 seedlings, about 50 per cent being hybrids made by Dr. Van Fleet for the purpose of securing blight-resistant types. The hybrids were chiefly the results of crosses between our American chinquapin and two Asiatic species, *Castanea crenata* and *Castanea mollissima*, imported by this Office. Straight seedlings of both the last named species have been grown in the orchard. Of all the chestnuts tested at Bell, the Chinese hairy chestnut seems to be the most promising so far as ability to resist blight, vigor, size, quantity and quality of nuts produced are concerned.

The question arises as to whether the Chinese hairy chestnut may be regarded as a promising introduction for extensive forest planting to take the place of our own vanishing species in furnishing wood and bark for tannin material. That it will ever be able to do this is very doubtful. As a possible source of supplying nuts very closely resembling our own sweet and highly flavored native product, the Chinese form seems well worthy of study and further development. The tree lends itself readily to orchard culture and begins to bear when five or six years old. Trees for orchard culture may be planted as close as 12 by 12 feet or 14 by 14 feet. Such trees should not be pruned. Experience has shown that cutting the lower branches from the trunk invites blight infection. The trees do best when left to grow in bush form. Trees planted in this way must have good culture, the same as apple, peach or pear trees. They cannot be left to care for themselves with much hope of success. This fact may account in part at least for the heavy mortality in the trees distributed.

It would seem inadvisable under the present state of our knowledge regarding the Chinese hairy chestnut to undertake planting it on an extensive scale with a view to utilizing wood and bark for tannin purposes. It is true that this chestnut has a number of qualities to recommend it. In the first place it is a true species, and seedlings are readily grown. There is a large extent of territory in China where the tree grows from which seeds may be obtained at reasonable cost. The chief difficulty, however, is in connection with the harvesting and transportation of the seeds. Chestnuts lose their vitality quickly after harvesting and much care is required in hand-

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ling, packing and transporting them. Notwithstanding these difficulties, it is believed that the securing of quantities of seeds and producing seedlings in quantity from them is entirely practicable. Owing to the danger of further spreading the blight fungus, the seedlings would necessarily have to be grown and distributed within the range of our American species.

The Chinese tree does not appear especially vigorous nor does it attain large size, seldom, if ever, reaching a height of more than 40 feet. Preliminary studies of the wood, leaves and bark of this chestnut point to the fact that the tannin content is comparatively low. Further work must be done on this problem, however, before definite conclusions can be reached. In the event that it is found that the wood contains sufficient tannin to warrant utilization of the material for tanning purposes, it might be practicable to plant the trees thickly and handle them under the coppice plan. From the manner in which the Chinese hairy chestnut grows in thickly planted orchards, it would seem that it might lend itself to coppice culture. From the data secured by Frank N. Meyer and others who have visited the Chinese section where *Castanea mollissima* grows, it appears that there are many forms there worthy of study. The tree evidently has been under cultivation by the Chinese for a long time, and the nuts collected and sent to us have varied greatly in size and quality. It would seem well worth while to continue studies of this interesting plant, both as a possible immigrant that will in future supply us with a very desirable food product and also as a possible source of tannin material.

B. T. Galloway.

FOREIGN SEED AND PLANT INTRODUCTION

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